

Claims

1. A compound of Formula I (Fig 1(b))

5 wherein:

M is selected from:

10 a metal atom; a metal compound; 2H whereby one H is bonded to each of the two nitrogen atoms depicted as being bonded to M (positions 29 and 31 shown)

and wherein:

15 one or more of the Q groups is selected from: formula II (Fig 1(c)) or formula III (Fig 1(d)), with the remaining Q groups each being formula IV (Fig 1(e)):

wherein:

20  $R_{33}$  and  $R_{34}$  are independently selected from: H or methyl

$R_{35}$  is selected from: H;  $C_1$  to  $C_4$  alkyl;  $C_2$  to  $C_4$  alkenyl; methoxy; butoxy; propoxy;  $NH_2$ ;  $NH-(C_1 \text{ to } C_4 \text{ alkyl})$ ;  $N-(C_1 \text{ to } C_4 \text{ alkyl})_2$ ;  $S-(C_1 \text{ to } C_4 \text{ alkyl})$ .

25 each  $R_n$  and  $R_p$  group is independently selected from:  $C_1$  to  $C_{32}$  alkyl;  $C_2$  to  $C_{32}$  alkenyl; X-O-Y; X-phenyl  
 $X^2COOX^1$ ;  $X^2CONR^1R^{11}$ ; H; halide

wherein:

X and X<sup>2</sup> are independently selected from: a chemical bond; -(CH<sub>2</sub>)<sub>n</sub>- wherein n is an integer from 1 to 32; -(CH<sub>2</sub>)<sub>a</sub>-CH=CH(CH<sub>2</sub>)<sub>b</sub> where a and b are independently selected from integers 0-32 and a+b totals 32.

X<sup>1</sup> and Y are independently selected from: C<sub>1</sub> to C<sub>32</sub> alkyl; C<sub>2</sub> to C<sub>32</sub> alkenyl; H

R<sup>1</sup> and R<sup>11</sup> are independently selected from: H; C<sub>1</sub> to C<sub>32</sub> alkyl; C<sub>2</sub> to C<sub>32</sub> alkenyl; -(CH<sub>2</sub>)<sub>n</sub>-

with the proviso that where more than one Q is Formula II with the remaining Q group being Formula IV, at least one group independently selected from: R<sub>33</sub>, R<sub>34</sub>, R<sub>35</sub>, an R<sub>n</sub> group, an R<sub>p</sub> group, is not H.

2. A compound as claimed in claim 1 having formula V (Fig 1(f)).

Wherein:

M is selected from:

a metal atom; a metal compound: 2H whereby one H is bonded to each of the two nitrogen atoms depicted as being bonded to M (positions 29 and 31 shown)

R<sub>3</sub> is H or methyl

R<sub>1</sub> and R<sub>4</sub> are independently selected from: H; C<sub>1</sub> to C<sub>4</sub> alkyl; C<sub>2</sub> to C<sub>4</sub> alkenyl; methoxy; butoxy; propoxy; NH<sub>2</sub>; NH-(C<sub>1</sub> to C<sub>4</sub> alkyl); N-(C<sub>1</sub> to C<sub>4</sub> alkyl)<sub>2</sub>; S-(C<sub>1</sub> to C<sub>4</sub> alkyl).

R<sub>8</sub> to R<sub>25</sub> are the same or different and are independently selected from:

C<sub>1</sub> to C<sub>32</sub> alkyl; C<sub>2</sub> to C<sub>32</sub> alkenyl; X-O-Y; X-phenyl  
X<sup>2</sup>COOX<sup>1</sup>; X<sup>2</sup>CONR<sup>1</sup>R<sup>11</sup>; H; halide

and wherein X, X<sup>2</sup>, X<sup>1</sup>, Y, R<sup>1</sup> and R<sup>11</sup> are as defined in claim 1.

3. A compound as claimed in claim 1 or claim 2 wherein all non-peripheral R groups other than those attached to pyridyl nuclei are selected from: H; alkyl containing up to 32; up to 20; between 4-14; or between 8-12 C atoms where 1 or more adjacent CH<sub>2</sub> groups may be replaced by O or a double bond, and the remaining R groups are all H.

4. A compound as claimed in claim 3 wherein all non-peripheral R groups are H.

5. A compound as claimed in any one of the preceding claims wherein all peripheral R groups other than those attached to pyridyl nuclei are selected from: alkyl containing up to 32; up to 20; between 4-14; between 8-12 C atoms, and the remaining R groups are all H.

6. A compound as claimed in any one of the preceding claims wherein R<sub>33</sub>, R<sub>34</sub>, R<sub>1</sub> and R<sub>3</sub> are H

7. A compound as claimed in any one of the preceding claims wherein R<sub>35</sub> and R<sub>4</sub> are electron donating groups independently selected from: O-alkyl, NH<sub>2</sub>, NH-alkyl, N(alkyl)<sub>2</sub>, alkyl, S-alkyl.

8. A compound as claimed in any one of the preceding claims wherein those the alkyl groups present within R groups are straight chain alkyl.

9. A compound as claimed in any one of the preceding claims wherein M is selected from: 2H; Ru, Ni, Pb, V, Pd, Co, Nb, Al, Sn, Zn, Cu, Mg, Ca, In, Ga, Fe, Eu, Lu and Ge.

10. A compound as claimed in claim 9 wherein M is selected from: 2H; Zn; Cu; Co; Ru; and Ni.

11. A compound as claimed in claim 10 having formula VI (Fig 1(g)) wherein M is selected from: 2H; Zn; Ni

12. A compound as claimed in any one of the preceding claims which has an absorption maximum in the near infra-red.

13. A compound as claimed in any one of the preceding claims which is soluble.

14. A composition comprising a compound as claimed any one of the preceding claims.

15. A pharmaceutical composition comprising a compound of any one of claims 1 to 13 in admixture with a pharmaceutically acceptable carrier.

16. A compound of any one of claims 1 to 13 for use in PDT.

17. A compound of any one of claims 1 to 13 for use in the preparation of a medicament.

18. A compound as claimed in claim 16 or claim 17 wherein the PDT or the medicament is for the treatment of a mammal having a tumour susceptible to photodynamic treatment.

19. A method of treatment comprising the step of exposing a compound as claimed in any one of claims 1 to 13 to laser radiation

20. Use of a compound of any one of claims 1 to 13 in an LC device.

21. An LC device comprising two spaced walls each bearing electrode structures and treated on at least one facing surface with an alignment layer comprising a compound as claimed in any one of claims 1 to 13.

22. An LC device as claimed in claim 21 which is an electro-optical display device.

23. Use of a compound of any one of claims 1 to 13 in an optical recording medium.

24. A method of storing or retrieving information comprising the step of exposing a compound as claimed in any one of claims 1 to 13 to laser radiation.
25. An optical recording medium comprising a recording layer, said layer comprising a compound as claimed in any one of claims 1 to 13.
26. An optical recording medium as claimed 25 wherein the compound is present as a spin coated film.
27. An optical recording medium as claimed in claim 26 wherein the compound is a near infra-red absorber.
28. Use of a compound of any one of claims 1 to 13 in a gas sensor.
29. A method of detecting a gas in a sample comprising the step of exposing a compound as claimed in any one of claims 1 to 13 to the sample.
30. A gas sensor comprising a compound as claimed in any one of claims 1 to 13.
31. A gas sensor as claimed in claim 30 wherein the compound is present as a spin coated film.
32. An LB film comprising a compound as claimed in any one of claims 1 to 13.
33. A molecular wire comprising a compound as claimed in any one claims 1 to 13.
34. Use of a compound as claimed in any one of claims 1 to 13 in a Photonic device.
35. A Photonic device comprising a compound as claimed in any one of claims 1 to 13.

36. Use of a compound as claimed in claimed in any one of claims 1 to 13 in any one of the following: electrocatalysis; photocatalysis; electric conduction; photoconductivity; electrochromism; a photovoltaic cell; a battery.

5 37. Use of a compound as claimed in any one of claims 1 to 13 in the production of a dimer.

38. A dimer or higher oligomer consisting of a compound as claimed in any one claims 1 to 13.

10 39. A mixed dimer or higher oligomer comprising a compound as claimed in any one and a further Pc or Pc derivative.

40. Use of a compound of any one of claims 1 to 13 in the production of a polymer.

15 41. A polymer consisting of a compound as claimed in any one of claims 1 to 13 in polymerised form.

42. An AzaPc essentially as described herein with reference to the accompanying  
20 Examples and Figures.

43. A method of producing a compound as claimed in any one claims 1 to 13 essentially as described herein with reference to Example 1.